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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,121	09/28/2001	J. G. Walacavage	200-0667	4437

7590 02/16/2007

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EXAMINER	
GEBRESILASSIE, KIBROM K	
ART UNIT	**PAPER NUMBER**
2128	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/966,121	WALACAVAGE ET AL.	
	Examiner	Art Unit	
	Kibrom K. Gebresilassie	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/19/2006 & 1/26/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is responsive to amended application filed on December 20, 2006.

2. Claims 1-19 are pending.

3. Claims 1, and 11 are amended.

Response to Arguments

4. Regarding applicants response to 102(b) rejection: Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoshi Kanai, and Takeshi Kishinami, herein referred as **Kanai,** "A Virtual Verification

Environment for the Sequence Control System Using VRML and JAVA", 1999 by ASME, pgs 1-8, in view of Matthew Rohrer, herein referred as **Rohrer,** "AUTOMOD PRODUCT SUITE TUTORIAL (Automod, Simulator, AutoSat) BY AUTOSIMULATIONS" Proceeding of the 1999 Winter Simulation Conference, pgs. 220-226.

As per Claim 1:

Kanai discloses a method of emulating machine tool behavior for a programmable logic controller logical verification system for manufacturing a motor vehicle (such as...***VRML-based virtual verification environment of PLC code, and procedures of building models and co-simulation...*; See: page 2, right side column, "2.1 Proposed procedures of PLC code verification"**), said method comprising the steps of:

constructing a mechanical model using a computer (such as...***In the co-simulation, models of the system components are built first in the compute, ...*; See: page 2, left side column, lines 15-17**);

generating transformational arrays for the mechanical model using the computer (such as...***The series snapshots during the co-simulation on the VRML viewer...*;See: Page 6, left side column, lines 25-26; fig. 9**);

viewing motion of the mechanical model in a motion viewer (such as...***The animation effect of the components can be achieved by adding the description of 5. This description can be defined in the ordinarily VRML authoring tools, and the dynamic behavior of the model can be executed on***

***the most of VRML viewer...*;See: Page 5, right side column, lines 15-19**) based on the transformational arrays using the computer (such as... ***The series snapshots during the co-simulation on the VRML viewer...*;See: Page 6, left side column, lines 25-26; Fig. 9**);

determining whether the motion of the mechanical model is acceptable (such as.... ***The makers of automated factory components respectively build the model of their component which has geometry and behavior in the VRML format. The pre-fabricated models are stored in public database...*; See: Page 2, right side column, "2.1 Proposed procedures of PLC code Verification" #1**);

replicating the motion of the mechanical model by generating PLC code for the motion of the mechanical model (such as... ***The control code of PLC is developed and implemented to the PLC. Input and output signals of the real PLC are connected to the VRML viewer. Co-simulation is executed by sending and receiving the I/O signals between the PLC and the viewer...*;See: Page 6, left side column; Fig. 2, and Fig. 3**); and

using the accepted motion of the mechanical model to compare the behavior of the PLC code relative to the accepted motion by playing the PLC code (such as... ***The programmer can visually check whether the every components in the equipment are working right...*; See: Page 5, left side column, #5, Fig. 3 and Fig. 7;...As a result of co-simulation, the model of the components in the VRML viewer (community-Place Browser) can be***

***dynamically moved according to the control code in the PLC...*;See: Page 6, left side column, lines 22-24; Fig. 9**) with a PLC emulator (such as... ***VRML Viewer...*;See: page 3, left side column, #5; Fig. 2**).

Kanai fails expressly to disclose incrementally recording one position of each piece of geometry of the mechanical model moved through space over a period of time using the computer.

Rohrer discloses incrementally recording one position of each piece of geometry of the mechanical model moved through space over a period of time using the computer (such as ...***vehicle states are tracked during the entire model run, and reports are generated automatically...*; See: page 224, "6.2 User Interaction" lines 11-20**).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Rohrer et al with Kanai et al because both references are clearly concerned with manufacturing and material handling systems. The motivation for doing so would have been convenient to track the vehicle (i.e. mechanical model) movement during the entire model run, as taught by Rohrer et al, to the system of Kanai et al to observe motion sequence and signal change and verify the effectiveness of the proposed modeling and implementation method.

As per Claim 2:

Kanai discloses a method as set forth in claim 1 wherein said of constructing comprises using a mechanical tool design system to construct the mechanical model (such as...***In the co-simulation, models of the system components are built first in the compute, ...*;See: page 2, left side column, lines 15-17**).

As per Claim 3:

Kanai discloses steps of constructing an electromechanical model (such as...***the code implemented on the programmable Logic Control (PLC) controls various system components such as actuators, sensors, mechanism, pneumatic and electric circuit, operating panels, etc in the equipment. Building the system components in the equipment...*;See: page 1, left side column, "1. Introduction" lines 4-8**).

As per Claim 4:

Kanai discloses step of constructing the mechanical model includes binding the electromechanical model to the mechanical model (such as... ***Building the system components in the equipment...*;See: page 1, left side column, "1. Introduction" lines 4-8**).

As per Claim 5:

Kanai discloses step of constructing the electromechanical model comprises using a PLC logical verification system to construct the electromechanical model (such as...***In order to realize visual verification of the PLC code, both 3-D geometry and dynamic behavior in each component must be modeled and implemented in the VRML....*;See: page 4, left side column, under a title "3.2 Reference model of the component" lines 1-3**).

As per Claim 6:

Kanai discloses step of generating transformational arrays based on computer aid design (CAD) geometries of the mechanical model (such as...***The series***

***snapshots during the co-simulation on the VRML viewer...*;See: Page 6, left side column, lines 25-26; fig. 9**).

As per Claim 7:

Kanai discloses step of exporting the mechanical model to a control system design system (such as... ***The programmer of the PLC code collect the models of the components from databases of several different makers individually through the network. The collected model imported to a VRML authoring tool...*;See: page 3, left side column, lines 1-4**).

As per Claim 8:

Kanai discloses step of constructing a motion file based on the mechanical model (such as ***...3D geometry of the components, their motion behaviors corresponding to the state transition of the component can be easily defined by adding the several standard nodes of VRML in the code...*;See: Page 3, right side column, #6**) and transformational arrays.

As per Claim 9:

Kanai discloses step of displaying further comprises playing the motion file by motion player (such as... ***the dynamic behavior of the model can be executed on the most of VRML viewer...*;See: Page 5, right side column, lines 15-19**).

As per Claim 10:

Kanai discloses step of returning to the mechanical tool design system if the motion of the mechanical model is not acceptable (such as such as... ***The programmer can visually check whether the every components in the equipment are working***

***right...*; See: Page 5, left side column, #5, Fig. 3 and Fig. 7**).

As per Claim 11:

Kanai discloses a method of emulating machine tool behavior for a programmable logic controller logical verification system for manufacturing a motor vehicle (such as...***VRML-based virtual verification environment of PLC code, and procedures of building models and co-simulation...*; See: page 2, right side column, "2.1 Proposed procedures of PLC code verification"**), said method comprising the steps of:

constructing a mechanical model using a computer (such as ...***In the co-simulation, models of the system components are built first in the compute*, ...;See: page 2, left side column, lines 15-17**);

generating transformational arrays for the mechanical model using the computer (such as...***The series snapshots during the co-simulation on the VRML viewer...*;See: Page 6, left side column, lines 25-26; Fig. 9**);

constructing a motion file based on the mechanical model and the CAD transformational arrays using a computer (such as...***The description of dynamic behavior can also added to the 3-D scene by using JAVA code as an external scripting language...*;See: Page 2, right side column, lines 8-10**);

viewing motion of the mechanical model in a motion viewer (such as...***The animation effect of the components can be achieved by adding the description of 5.... and the dynamic behavior of the model can be executed***

***on the most of VRML viewer...*;See: Page 5, right side column, lines 15-19**) based on the transformational arrays using the computer;

determining whether the motion of the mechanical model is acceptable (such as....***The makers of automated factory components respectively build the model of their component which has geometry and behavior in the VRML format. The pre-fabricated models are stored in public database...*; See: Page 2, right side column, "2.1 Proposed procedures of PLC code Verification" #1**);

replicating the motion of the mechanical model by generating PLC code for the motion of the mechanical model if the motion of the mechanical model was acceptable (such as...***The control code of PLC is developed and implemented to the PLC. Input and output signals of the real PLC are connected to the VRML viewer. Co-simulation is executed by sending and receiving the I/O signals between the PLC and the viewer...*;See: Page 6, left side column; Fig. 2, and Fig. 3**); and

using the accepted motion of the mechanical model to compare the behavior of the PLC code relative to the accepted motion by playing the PLC code (such as...***The programmer can visually check whether the every components in the equipment are working right...*; See: Page 5, left side column, #5, Fig. 3 and Fig. 7;...*As a result of co-simulation, the model of the components in the VRML viewer (community-Place Browser) can be dynamically moved according to the control code in the PLC...*;See: Page**

6, left side column, lines 22-24; Fig. 9) with a PLC Emulator (such as... ***VRML Viewer...*****;See: page 3, left side column, #5; Fig. 2**).

Kanai fails expressly to disclose incrementally recording one position of each piece of geometry of the mechanical model moved through space over a period of time using the computer.

Rohrer discloses incrementally recording one position of each piece of geometry of the mechanical model moved through space over a period of time using the computer (such as ...***vehicle states are tracked during the entire model run, and reports are generated automatically...*****;See: page 224, "6.2 User Interaction" lines 11-20**).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Rohrer et al with Kanai et al because both references are clearly concerned with manufacturing and material handling systems. The motivation for doing so would have been convenient to track the vehicle (i.e. mechanical model) movement during the entire model run, as taught by Rohrer et al, to the system of Kanai et al to observe motion sequence and signal change and verify the effectiveness of the proposed modeling and implementation method.

As per claims 12-19:

The limitations of claims 12-19 have already been discussed in the rejection of claims 2-7, and 9-10. The instant claims is/are functionally equivalent to the above rejected claims and is/are therefore rejected under the same rationale.

Conclusion

7. Claims 1-19 are rejected.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiring concerning this communication or earlier communication from the examiner should be directed to Kibrom K. Gebresilassie whose telephone number is (571) 272-8571. The examiner can normally be reached on Monday-Friday, 8:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner supervisor, Kamini Shah can be reached at (571) 272-2279. The official fax number is (571) 273-8300. Any inquiring of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is (571) 272-3700.

KAMINI SHAH
SUPERVISORY PATENT EXAMINER